

AMENDMENTS TO THE CLAIMS

1. (Previously Presented) A magnetic actuator comprising:
a first yoke including an assembly of laminated metal sheets;
a second yoke affixed to the first yoke;
a permanent magnet;
an armature located inside the first yoke and movable in reciprocating motion over a stroke between a first position and a second position, along a first direction; and
at least one coil, wherein
a flux generated by the at least one coil passes through a first magnetic circuit including the armature and the first yoke to move the armature toward one of the first and second positions, and
a flux generated by the permanent magnet passes through a second magnetic circuit including the permanent magnet, the first yoke, the second yoke, and the armature to hold the armature at one of the first and second positions.

Claim 2 (Cancelled).

3. (Currently Amended) The magnetic actuator according to claim 1, wherein the permanent magnet is located between the first yoke and the second yoke, ~~at an end~~ a surface of the second yoke facing the armature.

4. (Currently Amended) The magnetic actuator according to claim 1, including
a second magnetic air gap between the second position and ~~an end~~ a surface of the armature facing the second position when the armature is held at the first position, and
a first magnetic air gap, differing from the second magnetic air gap, between the first position and ~~an end~~ a surface of the armature facing the first position when the armature is held at the second position.

5. (Withdrawn) The magnetic actuator according to claim 1, wherein the second yoke is oriented along the first direction.

6. (Previously Presented) The magnetic actuator according to claim 1, wherein the second yoke is oriented along a second direction which is perpendicular to the first direction.

7. (Previously Presented) The magnetic actuator according to claim 1, wherein the second yoke includes an assembly of laminated metal sheets.

8. (Withdrawn) The magnetic actuator according to claim 1, wherein a first yoke section of the first yoke at the second position of the armature has a smaller cross-sectional area than a second yoke section of the first yoke at the first position of the armature.

9. (Withdrawn) The magnetic actuator according to claim 1, wherein the first yoke has stepped surfaces creating a partial air gap between the first yoke and the armature when the armature is held at either of the first and second positions.

10. (Withdrawn) The magnetic actuator according to claim 1 further comprising a jack bolt fitted to the second yoke, wherein the permanent magnet is affixed to the second yoke and an air gap between the armature and the permanent magnet can be varied by operating the jack bolt, so a metal sheet can be inserted between the second yoke and the first yoke.

11. (Previously Presented) The magnetic actuator according to claim 19, wherein a magnetomotive force produced by the first coil differs from a magnetomotive force produced by the second coil.

12. (Withdrawn) The magnetic actuator according to claim 1, wherein the at least one coil includes multiple coils.

13. (Previously Presented) The magnetic actuator according to claim 1, wherein an end portion of the armature through which the fluxes pass, facing the first yoke, has a smaller cross-sectional area than other portions of the armature through which the fluxes pass.

14. (Previously Presented) The magnetic actuator according to claim 1, wherein the armature includes an assembly of laminated metal sheets.

15. (Previously Presented) The magnetic actuator according to claim 14, wherein the laminated metal sheets are bound together with solid end plates at both ends of the assembly of the laminated metal sheets.

16. (Previously Presented) The magnetic actuator according to claim 15, wherein peripheral surfaces of each of the end plates are positioned inside of end surfaces of the assembly of laminated metal sheets.

17. (Previously Presented) The magnetic actuator according to claim 1, wherein the permanent magnet is located within the first yoke and the second yoke, and between elements of the second yoke.

18. (Withdrawn) The magnetic actuator according to claim 1, further comprising an actuating mechanism moving the armature along the first direction.

19. (Previously Presented) The magnetic actuator according to claim 1, including a first coil and a second coil fitted to the first yoke.

20. (New) The magnetic actuator according to claim 1, wherein the first magnetic circuit does not include the permanent magnet.

21. (New) A magnetic actuator comprising:

- an armature located inside the first yoke and movable in reciprocating motion over a stroke between a first position and a second position, along a first direction;

- a coil surrounding the armature;

- a first yoke including an assembly of laminated metal sheets and having an end face facing a side face of the armature, the first yoke including a holding part for holding the armature and an extending part extending from the end face to the holding part along an outer circumference of the coil;

- a permanent magnet; and

- a second yoke including a mounting part attached to the first yoke and a connecting part connected to the permanent magnet.

22. (New) The magnetic actuator according to claim 1, wherein the first yoke has a first surface perpendicular to a lamination direction of the metal sheets, and

the second yoke is attached to the first surface of the first yoke.

This listing of claims replaces all prior versions, and listings, of claims in the application.